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ABSTRACT

Charles Sanders Peirce, the progenitor of an entire school of philosophy, profoundly influenced our educational system, yet was curiously silent on educational questions. This paper discusses his early upbringing and schooling, and his involvement in education as a lecturer and professor. The major focus is on Peirce's written thoughts on education, which were sparse. The longest of these was in the form of a letter to Daniel Coit Gilman, written January 13, 1878. It expresses Peirce's thoughts on the organization and administration of an academic department, as well as his conviction that in the teaching of science "the professor's object ought to be to let his pupil as much into the interior of scientific thinking as possible, and for that purpose he should make his lecture experiments resemble real ones as much as possible." He felt that students who intended to be physicists should be in a laboratory situation from about age 9 to 12 and then return at 18 or 20. Peirce also wrote on mathematical logic and its relation to education, and on the nature of the university. He also gave consideration to teaching mathematics. His thoughts on education were systematic and evolved in the light of his "pragmatic" principles. (AF)

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WAS PEIRCE AN "EDUCATIONAL" PHILOSOPHER?

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As student and teacher, Charles (Santiago) Sanders Peirce experienced almost every form of education available in this country during his lifetime. The progenitor of an entire school of philosophy, he profoundly (if indirectly) influenced the educational system, even after his death. For all this, he was curiously and uncharacteristically silent on educational questions.

Whether or not Peirce was a "precocious" child is unclear; whether the unusual and demanding elementary education given him at home by his father, Benjamin Peirce, then America's foremost mathematician, counterfeited or augmented precocity, is a matter for debate.[1] In any case, Charles learned under his tutelage to read and write, began at eight the formal study of chemistry, and was subjected, in the name of concentration, to endless nocturnal games of double dummy, a circumstance which explains his later singlemindedness, his refusal to order his activities according to the revolution of the earth around the sun, his preoccupation with logic, and his foul temper.

At length, his father allowed him to attend private schools, whose relative lack of rigorousness must have been a pleasant surprise, and the Cambridge High and Latin School. The last-mentioned experience cannot have been too productive, as Charles required a further term in E.S. Dixwell's school to prepare for Harvard.

Nor was his stay at Harvard distinguished; he finished seventy-first in a class of ninety-one (seventy-ninth of ninety-one in his senior year) in 1859.

Just three years later, in 1862, he received his M.A. from Harvard, and the following year he achieved the Sc.B., the first of its kind, summa cum laude in chemistry. And there his formal education ended.

Yet his involvement with formal education had not ended. His alma mater appointed him lecturer in philosophy of science in 1864-65, and subsequently granted him lectureships in philosophy in 1869-70

and in logic in 1870-71. From 1879-84, the Johns Hopkins University employed him as a lecturer in logic, his longest teaching assignment. In addition, there were scattered lecture assignments at Lowell Institute, Bryn Mawr, and Harvard.

While Charles Peirce was more heavily involved with education than most men, it is clear that formal educational commitments were far from central in his career. It was while working for thirty years in the U.S. Geodetic Survey that he forged his various reputations in physics and philosophy.

Nonetheless, he had a mighty, if indirect, effect on Americaneducational theory and institutions. His effect on William James, in whose honor he took the middle name "Santiago," was immense, even though he ultimately chose to distinguish his ideas from those of James by adopting for his own thought the ugly neologism, "pragmaticism."[2] Again, his influence on John Dewey's notion of the logic of induction, and hence upon Dewey's entire system, was critical.[3]

The core of Peirce's thought was his relation of philosophy to scientific and empirical methods. Since concepts of objects cannot exist apart from the objects themselves, knowledge must be based on experience. Thus he formulated his pragmatic principle: "Consider what effects, which might conceivably have practical bearings, we conceive the object of our conception to have. Then, our conception of these effects is the whole of our conception of the object."[4] It follows that practical consequences are the sole test of ideas. The test is ultimately social, as it depends upon the agreement of competent observers.

That a man's thought had powerful implications for education does not, of course, mean that he was an educational philosopher, as is evident from this precis of his central line of reasoning. Peirce's thoughts on education as such seem at best to have been fragmentary. At his death in 1914, he left behind a corpus of unpublished works, the editor of which commented:

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> There are hundreds of them, without dates, with leaves missing, unpaginated and disordered; there are duplicates and fragments, repetitions and restatements. His interests were not restricted to logic, pragmatism, metaphysics, mathematics, geodesy, religion, astronomy, and chemistry. He also wrote on psychology, early English and classical Greek pronunciation, psychical research, criminology, the history of science, ancient history, Egyptology, and Napoleon, prepared a thesaurus and an editor's manual, and did translations from Latin and German. 5

In this vast and varied output, only a few pages refer specifically to education!

One may well ask, then, whether such ideas as Peirce expressed on education were truly informed by his philosophic researches or are simply to be classed among those less than moderately perceptive dicta which most professors, without benefit of a deal of focussed thought, and for no remarkably good reason, manage inevitably to produce on the subject of education.

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The lengthiest of his animadversions on education is in the form of a letter to Daniel Coit Gilman, written January 13, 1878, when Peirce was being considered for the chairmanship of the Physics Department at Johns Hopkins.[6] Since the primary direction of the letter is

toward exposing to Gilman Peirce's thoughts on the organization and administration of an academic department, its relevance to the great questions of educational philosophy ought to be peripheral. Yet we find Peirce pronouncing:

> The professor's object ought to be to let the pupil as much into the interior of the scientific thinking as possible, and for that purpose he should make his lecture experiments resemble real ones as much as possible, and he should avoid those exhibitions of natural magic which impress the mind with a totally perverted idea of science. For this reason, I would have a doubt of any man's real capacity for teaching physics as it ought to be taught, who should seem to delight as much in a "lecture experiment" as in one undertaken bonafide to find out something. 7

This comment places Peirce thoroughly in tune with the later elaboration of the project method by Kilpatrick. Ideally, he notes, this sort of procedure is best suited to special students who "should be made to feel that they were doing real and important work which was to appear in the digests of science and for the accuracy of which they were responsible.[8]

The benefits of this style of teaching are

manifold:

> . . . from the first the pupil feels himself an apprentice—a learned but yet a real worker; he is introduced to a great and important investigation (I would not tell him too much about it at first; I would make him feel that I am going to use him for my purposes and that if he desires to use me for his he must put forth a strong volition to do so) and of this investigation he has a necessary part to do; he is not working for practice merely; his investigation is not burdened with fancying he is doing something serious, nor is he made to consider things serious which are not so. In the next place, he gets clearly in his mind the high place occupied by the organizing element. He sees a great whole of investigation, and he escapes the frequent destiny of clever men who do not know how to lay out their work to advantage. Then, his theoretical knowledge takes from the outset the shape in his mind in which it appears in practice, so that it is entirely clear. [9]

So convinced was he of the workability of this system, that he insisted that boys who intended to be physicists ought to be involved in a laboratory situation from about age nine to twelve, and then return at eighteen or twenty.[10]

General students, of course, demand quite different treatment, one which involves lecturing, but not exclusively. They ought to be exposed to the moral and logical lessons of physics, instructed as to the purposes, ideas, methods, and life of the physicist, and taught the main laws of physics "in a hundred applications."[11]

The remainder of the letter is devoted to comments on the competence of Henry Rowland, the other (and ultimately successful) candidate for the post, and upon Peirce's own strengths and ambitions. No reader of the epistle would be at all surprised that Rowland was chosen Chairman of the Physics Department and Peirce made Lecturer in Logic.

Some twenty years later, Peirce wrote for Educational Review an article on mathematical logic and its relation to education. The article's focus is almost entirely upon the distinction between mathematical and philosophical logic, but it does demonstrate a certain concern for the order in which things are to be taught.[13]

In one of his numerous assignments for the Century Encyclopedia, Peirce turned his attention to the nature of the university, defining it as:

> An association of men for the purpose of study, which confers degrees which are acknowledged as valid throughout Christendom, is endowed, and is privileged by the state in order that the people may receive intellectual guidance, and that the theoretical problems which present themselves in the development of civilization may be resolved. 14

The definition is remarkable in that it makes not the slightest allowance for the function of instruction (the reference to the peoples' reception of "intellectual guidance" obviously being intended in the widest possible sense). The editors wrote to him that they conceived of the university as an institution for instruction, and Peirce replied that

> if they had any such notion they were grievously mistaken, that a university had not and never had had anything to do with instruction and that until we got over this idea we should not have any university in this country. 15

This notion may well account for Peirce's pedagogical shortcomings. He spent only eight years of his long life as a university lecturer, and, while he was an inspiring teacher for committed and advanced graduate students, he was unintelligible to others.[16] Indeed, his faults as a teacher can be readily discerned in the evaluation of one of his brightest pupils:

> He got his effect not by anything that could be called an inspiring personality, in the usual sense of the term, but rather by creating the impression that we had before us a profound, original, dispassionate and impassioned seeker of truth. No effort was made to create a connected and not inconsistent whole out of the matter of each lecture. 17

Were this not enough, another of his graduate students chimes in with this comment:

> A deep conviction of the significance of the problems presented and a mastery of the intellectual processes were his sole and adequate pedagogical equipment. 18

Clearly, whatever paper concessions he had been prepared to make to general students in physics courses had small effect on his conception of the function of a university and on his style of teaching.

Commenting further on the American university, Peirce deplored the tendency to evaluate professorial contributions in economic terms rather than in terms of theoretical research. Acknowledging that he himself had been quick to "subordinate the conception to the act, knowing to doing," he noted that

> Subsequent experience of life has taught me that the only thing that is really desirable without a reason for being so, is to render ideas and things reasonable. One cannot well demand a reason for reasonableness itself. Logical analysis shows that reasonableness consists in association, assimilation, generalization, the bringing of items together into an organic whole—which are so many ways of regarding what is essentially the same thing. 19

The university entirely devoted to study my well do some /a/

violence to the pragmatic principle, but Peirce cannot bear to part with either of them.

Peirce was particularly set against a university aiming to be a place "where any man can learn anything." Such a university, he felt, announces that the well-being of students is its only aim, that the temporal successes of its alumni are paramount. "What," he asked, "comes of such a conception of education and of life, for surely the purpose of education is not different from the purpose of life?"[20] The enunciation of this principle so familiar to later pragmatist educators thus comes in an unusual way, in support of a concept most of them would reject!

At any rate, there is indication that Peirce had thought about education systematically enough to attempt consistency in publications two decades apart. Moreover, he had given thought, at least in a general way, to the way in which one ought to teach.

That he also gave consideration to the methods of teaching mathematics is evident from a series of manuscripts he prepared for three mathematics texts

which were never published.[21] Unfortunately, the reader who is not thoroughly grounded in mathematics is able to derive from these manuscripts only that Peirce had a sound concept of the order in which different types of mathematics ought to be taught, and that his schemes for escaping rote learning and to involve the learner's imagination seem to anticipate the methods of the "New Math."

It would be possible and interesting, although probably a monumental and thankless labor of love, for some disciple, thoroughly acquainted with the entire structure of Peirce's philosophy, especially his epistemology, psychology, and methodology, to elaborate in full detail what Peirce might have proposed as a complete philosophy of education. But it is a pity that he did not do it himself.

NOTES

[1]This and all other biographical comments and speculations are based solely on the brilliant biographical essay by Paul Weiss, "Charles Sanders Peirce," Dictionary of American Biography, XIV, 398-403. Cf. also Thomas A. Goudge, The Thought of C.S. Peirce (Toronto, 1950), 326-46; Philip H. Wiener and Frederic H. Young, eds., Studies in the Philosophy of Charles Sanders Peirce (Cambridge, Ma., 1952), 271-334; and James Feibleman, An Introduction to Peirce's Philosophy: Interpreted as a System (N.Y., 1946), 3-31.

[2]Cf. Justus Buchler, Charles Peirce's Empiricism (N.Y., 1939), 166-74; Feibleman, 467-9.

[3]Charles Morris, The Pragmatic Movement in American Philosophy (N.Y., 1970), 52-3. Cf. also Feibleman, 474-83, and John Dewey, "The Pragmatism of Peirce," Journal of Philosophy, Psychology, and Scientific Method, XIII, 26 (Dec. 21, 1916), 709-15.

[4]The axiom first appeared in his article, "How to Make Our Ideas Clear," Popular Science Monthly (Jan., 1878), 293. Cf. also Collected Papers, 5.402 and Morris R. Cohen, Chance, Love, and Logic: Philosophical Essays by the Late Charles S. Peirce, the Founder of Pragmatism (N.Y., 1956), 45.

[5]Weiss, 403.

[6]References to the letter are from Philip P. Wiener, Charles S. Peirce: Selected Writings (Values in a Universe of Chance) (N.Y., 1958), 325-30. It may also be found in Wiener and Young, 365-8.

[7]Peirce in Wiener, 325-6.

[8]Ibid., 328.

[9]Ibid., 328-9.

[10]Ibid., 329.

[11] Ibid.

[12] Educational Review (1898), 209-16; Wiener, 338-41.

[13] Peirce in Wiener, 340-1.

[14] The definition is reprinted in Wiener, 331.

[15] John Jay Chapman, cited in Wiener and Young, 278.

[16] Weiss, 402.

[17] Christine Ladd-Franklin, "Charles S. Peirce at the Johns Hopkins," Journal of Philosophy, Psychology, and Scientific Method, XIII, 26 (Dec. 21, 1916), 716-7.

[18] Joseph Jastrow, "Charles S. Peirce as a Teacher," Journal of Philosophy, Psychology and Scientific Method, XIII, 26 (Dec. 21, 1916), 723.

[19] Peirce in Wiener, 332.

[20] Ibid., 333.

[21] Cf. Carolyn Eisele, "Peirce's Philosophy of Education in His Unpublished Mathematics Textbooks," in Edward C. Moore and Richard S. Robin, eds., Studies in the Philosophy of Charles Sanders Peirce (Second series, Amherst, Ma., 1964), 51-75.

[22] Ibid., 52-3, 66-70.

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